

REMARKS

Reexamination and reconsideration of this application in view of the following remarks is respectfully requested. By this amendment, claims 1, 2, 5, 11, 13, 14, 17, 23, 25 and 29 are amended; claims 10 and 22 are canceled; and new claims 32 and 33 are added. No new matter was added. After this amendment, claims 1-9, 11-21 and 23-33 remain pending in this application.

Claim Rejections - 35 USC §112

Reconsideration of the rejection of claims 5 and 11 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter that the Applicants regard as the invention, is respectfully requested in view of the amendments to claims 5 and 11. The Applicants thank the Examiner for his remarks regarding “the air”; however, the amendments to claims 5 and 11 should now clearly indicate that the Applicants intend that claims 5 and 11 further limit claims 3 and 11, respectively.

Claim Rejections - 35 USC §102

Reconsideration of the rejection of claims 1-31 under 35 U.S.C. §102(a) as being anticipated by Singh et al., (“Singh”, WO 02/23585), in light of Levinstein et al., (“Levinstein”, US 4,256,534) and Kyotani (US 6,409,802) is respectfully requested in view of the cancellation of claims 10 and 22, in view of the amendments to claims 1, 2, 5, 11, 13, 14, 17, 23, 25 and 29, and for the following reasons.

With the Applicants’ invention the test (for detecting any leak of air into the reactor) is performed when no wafer is loaded in the reactor (see the “remove” step 325, and see the steps comprising the test that begins at step 340, within the flow diagram of FIGS. 3a and 3b of Applicants’ specification). New dependent claim 32, which depends from independent claim 1, has been added to specifically recite this detail. The light emission of the plasma is analyzed to identify the presence of a specific constituent such as CN or another component (see the paragraphs that

begin at page 11, line 15; and page 13, line 14 of Applicants' specification). The monitored constituent is not present in the original composition of the plasma. The monitored constituent is generated only in the presence of air in the reactor, as a result of the monitored constituent's reaction with the plasma. The reactor of the Applicants' invention is specifically designed for this purpose (see the paragraphs that begin at page 8, line 29; and page 9, line 15 of Applicants' specification).

Singh et al. (WO02/23585) relates to a process for etching a wafer (see page 4, lines 19-26 of Singh). The method disclosed in Singh is aimed at detecting the completion of an etching process. In contrast with the Applicants' invention, in the method of Singh, the test is (for detecting any leak of air into the reactor) is performed when a wafer is loaded in the reactor. For this purpose, the species relating to the etching process are monitored, so as to identify the completion of the etching process, which occurs when the species disappear (see page 5, lines 2-6 of Singh). Singh uses the same method for detecting any leak of air into the reactor. Indeed, Singh points out that, in the presence of air, the corresponding foreign species react with the plasma thereby modifying its intensity. This change, which occurs at the start of the pumping cycle of one of the load locks, can be detected by monitoring the same species as above (see page 5, lines 7-15 of Singh). In Singh, species that were already present in the plasma are monitored (not new ones that were not present in the plasma). Moreover, in sharp contrast with the Applicants' invention, Singh detects a short dip in the plasma intensity, i.e., a reduction that is only transient (and not a steady increase of the concentration of the new constituent).

The method of Singh is far less accurate than the Applicants' invention (see the paragraphs that begin at page 12, line 13; and page 12, line 16 of Applicants' specification). Indeed, the monitoring of the plasma being used during the etching process – as disclosed in Singh – does not allow achieving the desired result in any situation. For example, consider a leak of air that is present in the reactor before starting the etching process. In this case, no dip in the plasma intensity is experienced; therefore, the method of Singh would be completely ineffective in detecting the corresponding leak of air.

The Applicants disagree with the Examiner's assertion that Singh suggests "cleaning the reactor" before establishing the plasma within the reactor. A careful re-reading of Singh will reveal that Singh fails to suggest "cleaning the reactor" before establishing the plasma within the reactor.

Claim 1 was amended to specifically insert the additional step of "removing nitrogen-based compounds from a chamber of a reactor". This amendment finds support at page 8, lines 15-21, and at page 13, line 23 of the Applicants' specification.

The combination of Singh, Levinstein and Kyotani fails to disclose all the steps of amended claim 1. In particular, the combination of Singh, Levinstein and Kyotani fails to disclose the first step of amended claim 1, to wit:

"... removing nitrogen-based compounds from a chamber of a reactor"

Amended independent claims 13, 25 and 29 recite language that is analogous to the above language recited in the first step of amended independent claim 1.

Referring now specifically to claims 5 and 11. These claims were amended to add the limitation of "wherein the fluorocarbon constituent of the gas facilitates the reaction of the nitrogen with the plasma". This change finds support at page 9, line 3-6 of the Applicants' specification. The combination of Singh, Levinstein and Kyotani fails to disclose this newly added limitation.

Furthermore, claims 2-9 and 11-12 depend upon amended independent claim 1, claims 14-21 and 23-24 depend upon amended independent claim 13, claims 26-28 depend upon amended independent claim 25, and claims 30-31 depend upon amended independent claim 29, and because dependent claims recite all the limitations of the independent claim, it is believed, for this additional reason, that dependent claims 2-9, 11-12, 14-21, 23-24, 26-28 and 30-31 also recite in allowable form.

Accordingly, in view of the remarks above, in view of the amendments to claims 1, 2, 5, 11, 13, 14, 17, 23, 25 and 29, in view of the cancellation of claims 10 and 22, and because the combination of Singh, Levinstein and Kyotani does not teach, anticipate, or suggest the presently claimed invention, the Applicants believe that the rejection of claims 1-31 under 35 U.S.C. §102(a) has been overcome. The Examiner should withdraw the rejection of these claims. Additionally, new claims 32 and 33 depend directly or indirectly from amended independent claim 1 and are not taught or anticipated or suggested by any individual reference or any combination of Singh, Levinstein, and Kyotani, for at least the reasons already discussed above. The Examiner should also allow these new claims.

Reconsideration of the rejection of claims 1-31 under 35 U.S.C. §102(b) as being anticipated by Sui ("Sui", WO 00/03421) is respectfully requested in view of the cancellation of claims 10 and 22, in view of the amendments to claims 1, 2, 5, 11, 13, 14, 17, 23, 25 and 29, and for the following reasons.

Sui (WO00/03421) relates to a method for detecting the endpoint of etching processes (see page 1, lines 8-9, page 3, lines 17-20, and page 16, lines 18-21). Sui monitors the intensity of the radiation at predefined wavelengths that vary during different stages of the etching process, so as to allow detecting the desired endpoints (see page 19, lines 1-4). If a radiation change (indicating the endpoint) occurs at the same time as an abnormal change in a "process condition signal", a fault endpoint is detected (see page 19, lines 5-10). A generic "helium leak rate" is the only process condition that is listed in Sui among the conditions listed at page 18, lines 6-11 of Sui.

The Examiner cited 35 U.S.C. §102(b), and a proper rejection requires that a single reference teach, i.e., identically describe, each and every element of the rejected claims as being anticipated by Sui. "To anticipate a claim, the reference must teach every element of the claim". See MPEP ¶2131. "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the . . . claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Sui fails to disclose all the steps of claims 1-31. In particular, Sui fails to disclose the first step of amended claim 1, to wit:

"prior to establishing a plasma inside a chamber of a reactor, removing nitrogen-based compounds from the chamber of the reactor"

As stated previously, amended independent claims 13, 25 and 29 recite language that is analogous to the above language recited in the first step of amended independent claim 1.

The Applicants disagree with the Examiner's assertion that Sui suggests "cleaning the reactor" before establishing the plasma within the reactor. Sui merely discloses, at page 19, lines 29-31, "... a cleaning gas to simultaneously clean a process chamber during the processing ...". However, Sui does not disclose the step of "prior to establishing a plasma inside a chamber of a reactor, removing nitrogen-based compounds from the chamber of the reactor". Therefore, the Applicants' invention removes nitrogen-based compounds from the chamber of the reactor at a different juncture than when Sui cleans its chamber.

Furthermore, claims 2-9 and 11-12 depend upon amended independent claim 1, claims 14-21 and 23-24 depend upon amended independent claim 13, claims 26-28 depend upon amended independent claim 25, and claims 30-31 depend upon amended independent claim 29, and because dependent claims recite all the limitations of the independent claim, it is believed, for this additional reason, that dependent claims 2-9, 11-12, 14-21, 23-24, 26-28 and 30-31 also recite in allowable form.

Accordingly, in view of the remarks above, in view of the amendments to claims 1, 2, 5, 11, 13, 14, 17, 23, 25 and 29, in view of the cancellation of claims 10 and 22, and because Sui does not teach, anticipate, or suggest the presently claimed invention, the Applicants believe that the rejection of claims 1-31 under 35 U.S.C. §102(b) has been overcome. The Examiner should withdraw the rejection of these claims. Additionally, new claims 32 and 33 depend directly or indirectly from amended independent claim 1 and are not taught or anticipated by Sui at least for the reasons already discussed above. The Examiner should also allow these new claims.

Reconsideration of the rejection of claims 1-3, 13-15, 25-26 and 29-30 under 35 U.S.C. §102(b) as being anticipated by Zajac (U.S. Pat. No. 4,857,136) is respectfully requested in view of the amendments to claims 1, 2, 13, 14, 25 and 29, and for the following reasons.

Zajac (US4857136) mainly relates to the detection of the end of an etching process (see column 2, line 66 through column 3, line 2). For this purpose, an additional chamber 26 is provided (see column 2, lines 26-45) even if the possibility of using the standard chamber 12 is not excluded (see column 3, lines 28-33). The ratio between the light emitted by two different components of the plasma is then monitored (see column 3, lines 2-10).

In addition to detecting the end of a process, Zajac also suggests the possibility of using the same solution for detecting air leaks during the above-mentioned etching process. Toward

that end, Zajac simply suggests monitoring gases or other substances that change in ratio, without suggestion of the formation of new constituent due to the reaction with the air. In contrast, the Applicants' invention does monitor for a new constituent due to the reaction with the air, which constituent was not present in the original composition of the plasma. Conversely, the examples of substances to be monitored, i.e., oxygen, seem to suggest that the comparison should be between a component of the original plasma and the oxygen itself (see column 3, lines 11-28).

The Examiner cited 35 U.S.C. §102(b), and a proper rejection requires that a single reference teach, i.e., identically describe, each and every element of the rejected claims as being anticipated by Zajac. "To anticipate a claim, the reference must teach every element of the claim". See MPEP ¶2131. "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the . . . claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Zajac fails to disclose all the steps of claims 1-3, 13-15, 25-26 and 29-30. In particular, Zajac fails to disclose the first step of amended claim 1, to wit:

"... removing nitrogen-based compounds from a chamber of a reactor"

As previously stated, amended independent claims 13, 25 and 29 recite language that is analogous to the above language recited in the first step of amended independent claim 1.

The Applicants disagree with the Examiner's assertion that Zajac suggests "cleaning the reactor" before establishing the plasma within the reactor. The only mention of the root word "clean" in Zajac is at column 3, line 13, where it is mentioned "system cleanliness".

Furthermore, claims 2-3 depend upon amended independent claim 1, claims 14-15 depend upon amended independent claim 13, claims 26 depends upon amended independent claim 25, and claims 30 depends upon amended independent claim 29, and because dependent claims recite all the limitations of the independent claim, it is believed, for this additional reason, that dependent claims 2-3, 14-15, 26 and 30 also recite in allowable form.

Accordingly, in view of the remarks above, in view of the amendments to claims 1, 2, 13, 14, 25 and 29, and because Zajac does not teach, anticipate, or suggest the presently claimed invention, the Applicants believe that the rejection of claims 1-3, 13-15, 25-26 and 29-30 under 35 U.S.C. §102(b) has been overcome. The Examiner should withdraw the rejection of these claims. Additionally, new claims 32 and 33 depend directly or indirectly from amended independent claim 1 and are not taught or anticipated by Zajac at least for the reasons already discussed above. The Examiner should also allow these new claims.

Conclusion

The foregoing is submitted as full and complete response to the Office Action mailed April 5, 2007. It is believed that the application is now in condition for allowance. Allowance of claims 1-9, 11-21 and 23-33 is respectfully requested.

No amendment made was related to the statutory requirements of patentability unless expressly stated herein. No amendment made was for the purpose of narrowing the scope of any claim, unless the Applicants have argued herein that such amendment was made to distinguish over a particular reference or combination of references.

The Applicants acknowledge the continuing duty of candor and good faith in the disclosure of information known to be material to the examination of this application. In accordance with 37 CFR §1.56, all such information is dutifully made of record. The foreseeable equivalents of any territory surrendered by amendment is limited to the territory taught by the information of record. No other territory afforded by the doctrine of equivalents is knowingly surrendered and everything else is unforeseeable at the time of this amendment by the Applicants and their attorneys.

The present application, after entry of this Response, comprises thirty-one (31) claims, including four (4) independent claims. The Applicants have previously paid for thirty-one (31) claims including four (4) independent claims. The Applicants, therefore, believe that a fee for claims amendment is currently not due.

The Commissioner is hereby authorized to charge any fees that may be required or credit any overpayment to Deposit Account No. **50-1556**.

PLEASE CALL the undersigned attorney at (561) 989-9811, should the Examiner believe a telephone interview would help advance prosecution of the application.

Respectfully submitted,

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